

derivatives via the Advanced Arbitrage Argument (AAA). The qualitative side explains how to incorporate investment risks, costs, factors, and other assumptions in the valuation, which is then quantitatively described and estimated. No prior invention, including Makivic, has taught or been able to achieve this.

The cited Makivic invention describes a numerical derivatives pricing method based on the random number generating Monte Carlo method, generating simulated underlying price paths using the securities' historical data. Makivic's derivative valuation does not consider any risks or investment costs, as do Applicant's inventions. Thus, Makivic's methods cannot model them qualitatively, and also do not apply such quantitative methodologies. Makivic's methods are significantly different than Applicant's.

The work of Makivic has enhanced the use of the well-known Monte Carlo simulation approach by modifying it with the use of Metropolis algorithm that is applied to the path selection process. (In this methodology, probability is used to accept or reject each of randomly generated underlying price paths.) The Examiner states that "Makivic also discloses algorithm is among the most flexible and is capable of pricing any kind of option." *See* October 1, 2002 Office Action, at p. 2. Applicant respectfully disagrees. Since Makivic does not show how to deal with modeling of the risks and costs, it naturally does not describe a relationship that exists between value of the derivative and the value of the risks and costs – which is at the center of the Applicant's inventions.

Contrary to the teaching of Makivic, Applicant's contribution to the derivatives pricing art springs from the formulation of the Advanced Arbitrage Argument (AAA), leading to the explicit quantitative relation between an investment made into a derivative contract and an alternative investment made into a so-called riskless government securities, by including all the

risks and costs associated with such an investment. This has led the Applicant into formulation of the Risk Adjusted Pricing (RAP) equation encompassing all these delicate relations into a simple and easily solvable form, with an output derived utilizing risks and costs assessments, and without the substantial computing power required by Makivic. Pursuant to Applicant's invention utilizing RAP, derivatives (and other securities) prices, and all their sensitivities, including parameter sensitivities, are obtained as a result of solving these derived, simplified equations. Moreover, these detailed and delicate quantitative analyses of this relationship described by the Applicant leads to some important, and until Applicant's inventions, unknown, conclusions. For example, it explains why there should be the so-called Volatility Smile observed in the marketplace when options are priced by the plain Black-Scholes equation; or it provides for an optimal re-hedging strategy as a function of the risk premiums and trading costs. Importantly, the work of Makivic does not show how to model or include risks and costs, and thus it also does not and cannot describe any relationship in these consequences either.

The Examiner states regarding Claim 1 that "It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teachings of Makivic in order to produce a derived option price for the underlying asset. The benefit would have been the results of to achieving an option price." See October 1, 2002 Office Action, at p. 3. Applicant respectfully disagrees, both because Applicant's inventions had been sought after for many years without success, and because Applicant respectfully asserts that Makivic's invention is not similar to Applicant's inventions, for the reasons stated above. The patented work of Makivic is a new way of pricing derivative securities using a Metropolis algorithm modification of the known Monte Carlo method that generates an option's value as an average (integral) over all admitted price paths of the underlying security. People were producing option prices using

Monte Carlo and other methods for a long time period before. That is not disputed. However, although people have been trying to determine how to model securities using risks and transaction costs for some time, it has not been done successfully until Applicant's invention. It is not obvious from Makivic how various risks and costs qualitatively and quantitatively impact the price of derivatives in his approach - since his approach does not deal with risks and costs in any way. Thus, Applicant respectfully disagrees that there is any suggestion or motivation to combine these steps with Makivic to arrive at Applicant's invention. This is so because, since Makivic does not deal with risks and costs in any way, he cannot teach how to include these risks and costs in any meaningful way.

Moreover, no suggestion or motivation is identified as to how to adapt Makivic to include the assessment of risks and transaction costs into a pricing model to arrive at Applicant's invention as claimed. Claims 1 and 2 each recite either "determining the risks associated with the said derivative" or "using a risk-adjusted pricing equation," which the Makivic reference does not disclose. The rejected claims are therefore novel and non-obvious, notwithstanding the Makivic reference.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

§ 2142 MANUAL OF PATENT EXAMINING PROCEDURE, 6th ed., 3rd rev. (July 1997) ["MPEP"], ch. 2100, p.108.

To reject claims in an application under section 103, an examiner must show an un rebutted *prima facie* case of obviousness. See In re Deuel, 51 F.3d 1552, 1557, 34 USPQ2d 1210, 1214 (Fed. Cir. 1995). In the absence of a proper *prima facie* case of obviousness, an applicant who complies with the other statutory requirements is entitled to a patent. See In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

*In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir.1998). "If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness." 2142 MPEP, ch. 2100, p.108.

It would not be obvious, and no reason is shown why one of ordinary skill in the art would modify the Makivic reference as the Office Action proposes. The Makivic reference is not pertinent to the problem of assessing and including the associated securities' risks and costs into a valuation methodology, as addressed by the present invention. Certainly, no reasonable expectation of success is anticipated in the teaching of Makivic.

Applicant respectfully suggests that the rejection depends upon the improper use of hindsight to re-create the presently claimed combination of ingredients. The invention is not obvious from the prior art itself. One cannot use hindsight reconstruction, picking and choosing among isolated disclosures in the prior art, to deny that the claimed invention is unobvious.<sup>1</sup>

To prevent the use of hindsight based on the invention to defeat patentability of the invention, this [Federal Circuit] court requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.

*In re Rouffet*, 149 F.3d at 1357. No such motivation has been shown. Claims1 and 2 are therefore non-obvious in view of the cited prior art.

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<sup>1</sup> In re Fine, 837 F.2d 1071, 1075, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988).

As stated, Makivic specifically addresses securities price modeling using primarily historical data -- and without inclusion of assessments of risks and transaction costs. *See, e.g.,* Makivic, at Abstract lines 3-5 and 7-9, and col. 3, lines 25 to 29. Because of the large volume of historical data as to each security, Makivic's invention requires substantial computing power. *See, e.g.,* Makivic, at Abstract, and col. 3, lines 34 to 38 and lines 59 to 62. Applicant's invention is a great improvement in that regard alone. Applicant's invention provides much more precise, and reliable, modeling because risks and costs are taken into account, and does not rely on vast amounts of purely historical data, as does Makivic. Applicant respectfully asserts that his inventions are not obvious in view of Makivic.

The Examiner states regarding the Claim 2, that essentially Makivic discloses the user inputs, the processing system, as well as output from the processor back to the user. The applicant respectfully disagrees. Since Makivic does not teach how to price a derivative security in a way that would explicitly take the risks and costs into account, it does not take the same inputs as required by the Risk Adjusting Pricing (RAP). And similarly, it does not value the derivatives using the parameters related to the risks and costs, so its processing does not generate derivatives values that are explicitly functions of risks and costs as modeled by RAP. And finally, Makivic does not output back to the user derivatives prices as computed according to the RAP methodology as in the Applicant's claimed inventions.

Applicant believes that the Claims are patentable over the prior art of record. Applicant respectfully asserts that Makivic fails to teach, or suggest, Applicant's claimed inventions.

### **Conclusion**

For all the foregoing reasons, Applicant believes the claims are in condition for allowance and respectfully requests that the Examiner allow Claims 1 and 2 to issue. Further,

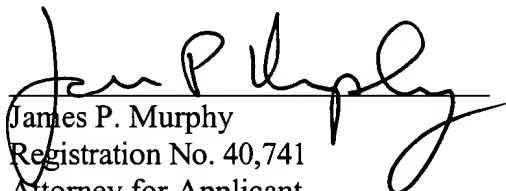
Applicant requests an Interview with the Examiner, to discuss any questions the Examiner may have with regard to the inventions, and to allow Applicant to further explain the novelty and non-obviousness of his inventions, and/or to demonstrate his inventions or prior art methodologies. The Examiner is invited to contact the undersigned attorney for the Applicant to indicate whether an Interview can be arranged.

Please charge any additional fees or credit any overpayment that may be incurred by the Applicant to Deposit Account No. 13-0017 (McAndrews, Held & Malloy, Ltd.).

Respectfully submitted,

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